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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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SEED INTELLECTUAL PROPERTY LAW GROUP PLLC  
701 FIFTH AVE  
SUITE 6300  
SEATTLE, WA 98104-7092

EXAMINER

IM, JUNGHWA M

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/747,425

Applicant(s)

LEONARDI ET AL.

Examiner

Junghwa M. Im

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 5,6,9,12-14 and 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,7,8,10,11,15,16 and 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election with traverse of claims 1-4, 7, 8, 10, 11, 15, 16 and 18 in Paper No. 8 is acknowledged.

Claims 5, 6, 9, 12-14 and 17 are cancelled.

The traversal is on the ground(s) that claim 1 is generic with respect to all of the figures.

This is not found persuasive. Note that the ground of restriction requirement is that instant invention contains several embodiments which require a separate search.

For example, one embodiment describes a resistive structure with a plurality of rung shaped polysilicon which is completely surrounded by a dielectric layer while second embodiment describes a resistive structure of a T-shaped polysilicon region with partial enclosure by a dielectric layer.

The requirement is still deemed proper and is therefore made FINAL.

### *Drawings*

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 2a in Fig.2 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

In Fig. 9, metallization 101 should be 95.

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A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Specification*

The disclosure is objected to because of the following informalities.

On page 8, line 12, instant invention recites "... the polysilicon region 83..." which should be 84.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-4 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites trenches having suitable areas which is not defined.

Claim 3 recites polysilicon and dielectric having winding patterns as described in Figure 8. The pattern shown in Figure 8 is not "winding" which means encircling or turning about.

Claim 4 recites that rungs are connected in parallel. Does it intend to mean a parallel connection electrically or physically?

Claim 7 recites said polysilicon region comprises two "undoped" polysilicon.

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Note that said polysilicon region in claim 1 is "doped".

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 2, 11 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Hashimoto (U.S. Pat. No. 5,856,702).

Regarding claim 1, Hashimoto shows in Fig. 6, a resistive structure, integrated in a semiconductor substrate 10, comprising a suitably doped polysilicon region 16 completely surrounded by a dielectric region 12, so that the resistive structure is isolated electrically from other components jointly integrated in the semiconductor substrate.

Regarding claim 2, Hashimoto shows in Fig. 6, portions of the resistive structure are formed with a plurality of trenches having suitable areas and are distributed about the polysilicon region 16 to form a single dielectric region 12.

Regarding claim 11, Hashimoto shows in Fig. 7, a resistive structure, comprising;  
at least one trench having sidewalls formed in a semiconductor substrate 10;  
a dielectric layer 12, entirely coating all walls of the at least one trench; and  
a polysilicon region 16 filling the at least one trench to be isolated dielectrically from the semiconductor substrate.

Regarding claim 15, Hashimoto teaches in Fig. 7, the polysilicon region 16 includes a doped surface region (col. 4, lines 21-25).

Regarding claim 18, Hashimoto teaches in Fig. 6, the substrate 10 comprising a plurality of trenches (regions with slots 14A, 14B, 14C) coupled together electrically by metallization 18.

***Claim Rejections - 35 USC § 102/103***

Claims 1, 7, 8 and 10 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hashimoto.

Claim 1 has been discussed previously.

Regarding claim 7, in so far as understood, Hashimoto teaches an impurity is introduced into an undoped polysilicon layer by ion implantation (col. 4, lines 27-30).

Also, note that a portion of instant claim recites the language for possible desired result, and language reciting a possible result would not carry weight.

In addition, implantation is a process designation, and a process limitation would not carry weight.

Regarding claim 8, Hashimoto teaches the first polysilicon layer is enhanced by angled implantation and a thickness dimension conforming to the sidewalls of the dielectric region to prevent said region from becoming filled completely (col. 3, line 64 – col. 4, line 7).

Note that "angled implant" is a process designation and would thus not carry patentable weight in this claim drawn to a product. See *In re Thorp*, 227 USPQ 964 (Fed. Cir. 1985).

Regarding claim 10, Hashimoto teaches the dielectric region that is arranged to isolate the resistive structure is formed in the process of oxidizing the sidewalls of a dielectric trench.

Hashimoto teaches a dielectric layer with a silicon oxide (col. 3, line 57).

Note that "the process of oxidizing" is a process designation and would thus not carry patentable weight in this claim drawn to a product.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Stone et al. (U.S. Pat. No. 5,753,391).

Claim 1 has been discussed previously.

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Regarding claim 3, Hashimoto does not explicitly teach the limitation over patterns of polysilicon and dielectric region.

However, Stone et al. disclose in Fig. 1 the polysilicon region 11 and the dielectric region are winding patterns in so far as understood with Fig. 8 of Applicant's, thereby reducing the space requirements of the resistive structure for a given resistance value (col. 1, lines 54-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the shape of the resistive layer of Hashimoto with the teaching of Stone et al. in order to minimize the size of a device through having a compact pattern of a passive structure in the substrate.

Regarding claim 4, Stone et al. show in Fig. 1, the winding patterns are formed to include rungs, the rungs are connected in parallel together by a metallization (14, 16, 18).

Alternatively, Hashimoto discloses in Fig. 5, the rungs (slots with dashed lines, 14A, 14B, 14B) are connected in parallel together by a metallization 22.

### ***Claim Rejections - 35 USC § 103***

Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Tsui et al. (U. S. Pat. No. 6,054,359).

Claim 11 has been discussed previously.

Regarding claim 16, Hashimoto does not teach the polysilicon region comprises first and second layers of polysilicon, the second layer being undoped and the first layer implanted with a dopant.



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However, Tsui et al show in Fig. 4, a device with a resistive structure which has a first doped polysilicon layer 24 and a second layer of undoped polysilicon 26 (Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Tsui et al. with the device of Hashimoto in order to have a desirable sheet resistance and more reliable contacts through having two layered polysilicon layered resistive structure.


### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JMI  
November 4, 2002

  
TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800